

WHAT IS CLAIMED IS:

1. A semiconductor device, comprising:

a substrate including an integrated circuit;

an interlayer insulating layer formed on said substrate;

a ferroelectric capacitor formed by a first electrode layer, a ferroelectric layer and a second electrode layer deposited on said interlayer insulating layer in this order;

a wiring layer electrically connecting said second electrode layer of said ferroelectric capacitor to said integrated circuit through a contact hole in said interlayer insulating layer; and

an insulating side wall film covering a peripheral section of said ferroelectric capacitor and being spaced from a peripheral edge section of said contact hole.

2. The semiconductor device according to the claim 1, wherein said integrated circuit includes a contact plug within said contact hole and said wiring layer electrically connects to said contact plug.

3. The semiconductor device according to the claim 2, wherein said interlayer insulating layer includes a plug oxidation protective film consisting of silicon nitride and silicon oxide , and said ferroelectric capacitor mounted on said interlayer insulating layer.

4. The semiconductor device according to the claim 1, wherein said insulating side wall film includes a hydrogen diffusion preventing layer.

5. The semiconductor device according to the claim 1, wherein said ferroelectric layer consists of bismuth strontium tantalate.

6. A method for manufacturing a semiconductor devices, comprising:  
an interlayer insulating layer forming step for forming an interlayer insulating layer on a substrate including an integrated circuit;

a contact hole forming step for forming a contact hole exposing a part of said integrated circuit through said interlayer insulating layer;

a capacitor forming step for forming a ferroelectric capacitor by depositing a first electrode layer, a ferroelectric layer and a second electrode layer on said interlayer insulating layer in this order;

a side wall film forming step for forming a side wall film covering a peripheral section of said ferroelectric capacitor so as to be spaced from a peripheral edge section of said contact hole; and

a wiring layer forming step for forming a wiring layer electrically connecting said second electrode layer of said ferroelectric capacitor to said integrated circuit through said contact hole formed in said interlayer insulating layer.

7. The method for manufacturing a semiconductor devices according to the claim 6, wherein said protective film forming step comprises an insulating protective film forming step for forming an insulating protective film having the isotropically same thickness to cover said ferroelectric capacitor, and an etching step for performing anisotropic etching on said protective film.

8. A method for manufacturing a semiconductor devices, comprising:

an interlayer insulating layer forming step for forming an interlayer insulating layer on a substrate including an integrated circuit;

a contact hole forming step for forming a contact hole exposing a part of said integrated circuit through said interlayer insulating layer;

a contact plug forming step for forming a contact plug within said contact hole;

a plug oxidation protective film forming step for forming a plug oxidation protective film consisting of silicon nitride and silicon oxide on said interlayer insulating layer;

a capacitor forming step for forming a ferroelectric capacitor by depositing a first electrode layer, a ferroelectric layer and a second electrode layer on said plug oxidation protective film in this order;

a heat treatment step for heat-treating said ferroelectric layer;

a side wall film forming step for forming a side wall film covering a peripheral section of said ferroelectric capacitor;

a plug oxidation protective film removing step for removing said plug oxidation protective film to extend said contact hole so as to expose said contact plug;

a wiring layer forming step for forming a wiring layer electrically connecting said second electrode layer of said ferroelectric capacitor to said contact plug through said contact hole.

9. The method for manufacturing semiconductor devices according to the

claim 8, wherein said side wall film is spaced from a peripheral edge section of said contact hole.

10. The method for manufacturing semiconductor devices according to the claim 9, wherein said protective film forming step comprises an insulating protective film forming step for forming an insulating protective film having the isotropically same thickness to cover said ferroelectric capacitor, and an etching step for performing anisotropic etching on said protective film.

11. The method for manufacturing a semiconductor devices according to the claim 8, wherein said side wall film forming step includes a step for removing said plug oxidation protective film except for a section of the oxidation protective film on which is mounted said ferroelectric capacitor on.